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EXAMINER

MOSS, KERI A

ART UNIT PAPER NUMBER

1743

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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/615,075	<b>Applicant(s)</b> FRANKLIN ET AL.	
	<b>Examiner</b> Keri A. Moss	<b>Art Unit</b> 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |  |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/23/03; 2/10/05</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Specification***

1. The use of the trademark REFLECTOQUANT® has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

### ***Claim Objections***

2. Claims 12 is objected to because of the following informalities: In claim 12, there is redundancy as La and Ce are lanthanides. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

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had possession of the claimed invention. Applicant has not disclosed in the specification or the claims what the "colorimetric sensitizer chemical" is. Without disclosure of the colorimetric sensitizer chemical, it does not appear that applicant has possession of the chemical that binds to the organometallic compound to form the organometallic complex. Without that essential chemical, the claimed reaction cannot take place.

In addition, the applicant has not disclosed in the specification what the "organometallic complex" is. Without disclosing the compound that is detected, it does not appear that applicant knows how to detect the presence of it.

5. Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As explained above, applicant has not disclosed one chemical that can be used as the colorimetric sensitizer chemical. Below, examiner discusses the lack of enablement within the context of the factors set forth in *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

(A) *The breadth of the claims.* The claims are broad, including a method of detecting the presence of a metallic species (which includes more than 30 different claimed metallic elements) comprising reacting a colorimetric detection material containing an

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undisclosed colorimetric sensitizer chemical with an organometallic compound in a hydrocarbon matrix with the resulting compound being an organometallic complex.

(B) *The nature of the invention.* The invention is a method for detecting the presence of a metallic species using a chemical sensitizer material and forming an organometallic complex.

(C) *The state of the prior art.* The term "colorimetric sensitizer chemical" is not a recognized term of art. A search for this term found only the instant application. The RQFLEX is a colorimetric detection material, but we do not know what chemical is the claimed "colorimetric sensitizer chemical." Zelaskowski (USP 3934976) discloses a method of detecting the presence of one metal, lead, using a complicated reaction, including what examiner guesses could be a possible equivalent of applicant's claimed "colorimetric sensitizer chemical": iodine solution. Another possible "colorimetric sensitizer chemical" disclosed by Zelaskowski is 4-(2-pyridylazo)-resorcinol (or PAR). Dynasol Elastormeros (EP 1 251 346 A1) discloses a sensor for determining organometallic compounds using an indicator dye that examiner guesses could be a possible equivalent to applicant's claimed "colorimetric sensitizer chemical" and includes a list of approximately 20 compounds. The metals can be from group 1, 2 or 13 of the periodic table.

(D) *The level of one of ordinary skill.* The prior art discloses dozens of compounds that contribute to the ability of a solution containing metal to change color.

(E) *The level of predictability in the art.* Chemical reactions are unpredictable by their very nature, therefore the art itself has unpredictability.

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(F) *The amount of direction provided by the inventor.* The applicant gives no guidance on what types of chemicals to use other than an instruction to use a compound that binds with the metal to be detected. This does not sufficiently enable one of ordinary skill in the art to make or use the claimed invention that changes color in the presence of a certain known metal and forms an organometallic complex.

Furthermore, without knowing the colorimetric sensitizer material, one would not know the organometallic complex formed when it binds with the metal and therefore would not know what complex to detect or how to detect it, i.e. what absorbance. Without knowing what to detect, one of ordinary skill in the art would not know whether the use of energy, acid or base is necessary for detection of the organometallic complex (see page 4 of the specification).

(G) *The existence of working examples.* There are no working examples of the colorimetric sensitizer chemical.

(H) *The quantity of experimentation needed to make or use the invention based on the content of the disclosure.* There is a necessity of a broad range of experimentation required to touch upon all the areas covered by the claims. One could not simply use any chemical that binds to any metal, for the invention to work, one needs a chemical that either changes color or results in a change of color when bound to only one metal. Furthermore, without knowing the colorimetric sensitizer material, one would not know if an organometallic complex forms when it binds with the metal and therefore would not know what complex to detect or how to detect it, i.e. what absorbance. One would additionally need to test the reaction products to determine whether it is an

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organometallic complex. Without knowing what to detect, one of ordinary skill in the art would not know whether the use of energy, acid or base is necessary for detection of the organometallic complex (see page 4 of the specification). One would need to conduct further testing to find out whether the use of energy, acid or base is necessary.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims **1-23** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what a "colorimetric sensitizer chemical" is. Is it a chemical that binds to metal and enables a color change? Is it a chemical that changes color when it binds to a metal?

8. Claims **1-23** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1 and 20 as well as the dependent claims, the terms "organometallic compound" and "organometallic complex" appear to represent the analyte and the detectable material, respectively. However, because the terms are used interchangeably within the specification, it is unclear what these terms represent. For example, page 8 lines 13-15 read "Thus, for example, the sandwich-like structure of ferrocene and MMT® illustrate certain embodiments of the organo portion of the organometallic compound detectable herein." In this sentence, the organometallic

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compound is the detectable material, which conflicts with the term as it is used in the claims. Therefore, it is unclear what the terms "organometallic compound" and "organometallic complex" represent.

9. In claims **1-23**, it is unclear whether the "organometallic compound" is MMT® or MMT® bound to ferrocene. If the "compound" is MMT and ferrocene, it is also unclear whether MMT® forms a compound with ferrocene, the two compounds simply interact with each other or if they in fact do interact.

10. In claim **14**, it is unclear what applicant is referring to. Claim 14 references a detection material from step (b) of claim 1, but there is no detection material mentioned in step (b).

11. In claim **17**, it is unclear what is the "organo" of the organometallic compound manganese.

### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims **1-16, 18-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Zelaskowski (USP 3,934,976). Zelaskowski discloses A method for detecting the presence of a metallic species in a hydrocarbon matrix comprising contacting a



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hydrocarbon matrix containing an organometallic compound (column 2 lines 10-32) with a colorimetric detection material (tetraethylammonium chloride) comprising a colorimetric sensitizer chemical (iodide or a di-alkali metal salt of 4-(2-pyridylazo)-resorcinol) able to react with the metal of the organometallic compound causing a reaction between the metal from the organometallic compound and the colorimetric sensitizer chemical sufficient to form an organometallic complex (column 2 lines 39-40), and detecting the presence of the organometallic complex (abstract). The detection material is exposed to sufficient energy to at least partially liberate the metal of the organometallic compound from the compound onto or within the detection material (column 3 lines 22-42). The energy is in the form of heat, sonic radiation, a chemical reaction due to a chemical added, ultraviolet radiation, or sunlight (column 3 lines 22-42). The energy is of a wavelength and intensity (measured in joules/mole) absorbed by the organometallic compound sufficient to decompose said compound (column 3 lines 22-42). The hydrocarbon matrix is selected from the group consisting of gasolines, petroleum distillate fuels, kerosene, diesel fuel, biodiesel fuel, fuel oil, crude oil, refined oil, lubricants, engine oils, transmission fluids, hydraulic oils, aviation fuels, cutting fluids, and distillate bottoms (column 1 lines 12-27). The metal of the organometallic compound is lead (title). The presence of the organometallic complex is detected by a photometer (column 4 lines 13-35). The method further comprises the step of combining the detection material with an amount of dilute basic solution to the at least partially liberated metal of the organometallic compound (column 2 line 54-column 3 line 28). The method further comprises the step of combining the basified metal with

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a dilute acid to oxidize the metal to an oxidation state able to react with the colorimetric sensitizer chemical (column 3 lines 43-60). The concentration of the organometallic compound in the hydrocarbon matrix is determined by translating the colorimetrically detected color intensity of the organometallic complex into a metal concentration value (column 4 lines 13-35). The method of claim 1, wherein the hydrocarbon matrix is selected from the group consisting of gasolines, diesel fuels, biodiesel fuels, fuel oil, industrial hydrocarbonaceous waste, and distillate fuels (column 1 lines 12-27).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Zelaskowski in view of* Dynasol Elastormeros (EP 1 251 346 A1) (hereinafter Dynasol). Zelaskowski does not expressly disclose an organometallic compound of manganese or methyl cyclopentadienyl manganese tricarbonyl. Dynasol teaches a method of determining the presence of metals by binding an indicator dye to organometallic compounds such as organomagnesium or methyl cyclopentadienyl manganese tricarbonyl (paragraph 9). An advantage of the Dynasol method is that it provides a for a continuous, in situ and real time measurement of the reaction threshold. (paragraph 13). An additional advantage of Dynasol is that it teaches conducting the reaction on a polymeric support. It would have been obvious for one of ordinary skill in the art to combine the methods of Zelaskowski with those of Dynasol to gain the advantages of conducting the reaction on a polymeric support and to gain the additional advantages of providing a continuous, in situ and real time measurement system in order to simplify the method of Dynasol.

### **Conclusion**

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bloch (USP 3,635,679) discloses a membrane on which a


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colorimetric determination of metal may be made. Fabbro (USP 3806319) teaches a method of detecting lead in gasoline. Zelaskowski (USP 3,955,927) teaches a method of detecting lead in gasoline using radiation, a basic and an acidic solution. VWR catalog, 2000/2001, page W 1026, "Reflectoquant analysis system" discloses a device for measuring metals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keri A. Moss whose telephone number is 571-272-8267. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
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